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## HAVE WE MORE THAN ONE SPECIES OF BLISSUS IN NORTH AMERICA?

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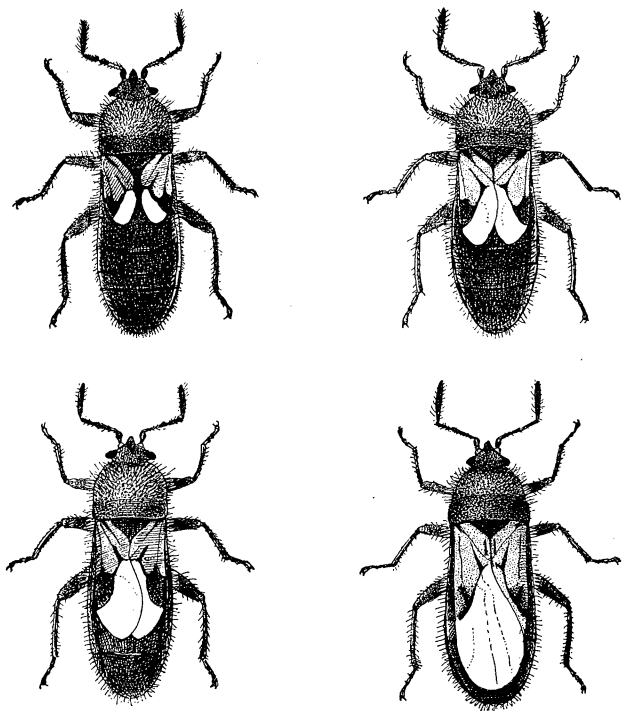
It is a fact, well known among entomologists, that the original description of *Blissus leucopterus* Say was drawn up from a single specimen taken on the eastern shore of Virginia. This was, therefore, probably a macropterous individual belonging to the maritime race that inhabited the Atlantic coast. It was not until long after that the brachypterous form was discovered, and attention was first directed thereto by Dr. Asa Fitch in his second report on the insects of the state of New York, and it was figured by Riley in *The American Entomologist*, Vol. I, p. 174, May, 1869, Dr. Fitch designating it as variety *apterus*. The infrequency with which this brachypterous form has been observed in the past is due to its almost universally secluded habits, as will be explained later.

Say's description, in which he named the insect *Lygæus leucopterus*, appeared in 1831, and in 1850 Dr. William Le Baron, afterwards state entomologist of Illinois, having overlooked Say's description, again described the species as *Rhyparochromus devastator*, the description, this time, having been based on material secured in Illinois, where the species was at that time excessively abundant.

According to Professor Cockerell there appeared in 1893, in *Ann. Soc. Ent. Belg.*, Vol. XXXVIII, two additional descriptions, namely, *B. hirtus*, from North America, and *B. pulchellus*, from Central and South America, both by Montandon. As the specimens recorded from the islands of Granada and St. Vincent by Uhler, and which were collected by Mr. H. H. Smith, are said to be of larger size and more variable than *leucopterus* and with fully developed wings, it would seem that Professor Cockerell may be right in thinking that these were, perhaps, Montandon's *pulchellus*. Just what his *hirtus* may

be I am unable to conjecture. *Leucopterus*, or what has been universally conceded as that species, has been collected in Panama and other localities in Central America; but as the collecting was probably somewhat superficial, we have very likely much to learn regarding the species in that country.

Along the Atlantic coast from central Florida to Nova Scotia and inland to northern Indiana, Ohio, and Ontario, we



Figures illustrating variation in wings of Atlantic maritime race of *Blissus leucopterus*.

have what I have here termed a maritime race, composed of individuals of both sexes whose wings may be nearly or quite aborted, or varying between these and the completely winged, and which freely interbreed, both with each other and the inland race, among whom brachypterous individuals are not usually found.

On the Pacific coast, in the vicinity of San Francisco, a similar race occurs, including also brachypterous individuals.

Whether this is in all respects similar to the Atlantic coast race or not is yet to be determined. This last is as yet known only in California, but it is not unlikely that it will in future be found to extend along the entire coast from California southward to Panama. The similar race that occurs along the Atlantic is at present known, to the southward, only to the Atlantic coast of Florida, not having yet been observed, so far as known, anywhere along the Gulf of Mexico. It must be stated, however, that except in the closest proximity to the sea, where Mr. Schwarz has found that it lives on the upper portion of its food plant, these brachypterous individuals are found only about the roots of their food plants, usually slightly below the surface of the soil, so that their detection is not an easy matter, unless one searches carefully for them. It must, therefore, be said that we really do not know whether this race occurs along the Gulf coast or not.

A somewhat extended study of this maritime race in Ohio has disclosed some interesting differences between the habits of this and the exclusively macropterous race inhabiting the interior of the country. These differences, together with minor anatomical ones, have been thought by some entomologists to be sufficient grounds for separating Say's *leucopterus* from Le Baron's *devastator* and making a separate species of each. I will give these differences between the two, as I have found them in Ohio, taking up first the maritime race.

The Atlantic maritime race is composed of brachypterous and macropterous individuals, the relative number of each being, so far as observed, somewhat variable. As the macropterous individuals may take wing and abandon in spring the fields occupied by the two forms jointly, it is obviously impossible to make any estimates of their relative numbers except during hibernation or immediately after the young have developed to adults. I have not found that the macropterous individuals part company with the brachypterous individuals with anything like the celerity or entirety that has been observed in the case of the European species, *Blissus doraë*, as witnessed by Professor Sajö. In our species both forms may be found together at all times, but where a field of corn or wheat adjoins a meadow, the

macropterous individuals only will be found among the grain, while the brachypterous ones will as uniformly remain in the timothy meadow. Among this race I have never been able to detect the slightest indication of a second brood. It is apparently much less affected by wet weather during the breeding season. This has also been observed by the late Dr. Lintner in New York. In the meadows the attack of *Sporotrichium* is much less marked, but in the insectary this has not proved true, thus indicating that the difference may be one of environment rather than in the resistant power of the insect itself. In the *Report of the U. S. Commissioner of Agriculture* for 1887, Pl. I, Figs. 1-8, the brachypterous maritime form is shown as quite different both in form and color from those found inland. Mr. Schwarz has since stated in *Insect Life*, Vol. VII, p. 420, that this difference in color was unreal, while Dr. Howard wrote me last summer that figures drawn from the material sent him from Ohio represented the maritime individuals much better than Fig. 8, in the plate, in the Commissioner's Report above referred to; so that it would seem that the striking differences there indicated do not exist in fact. Mr. Van Duzee has called attention to a possible difference between specimens from New York and Kansas, the former seeming to be more hairy and robust than the latter, but he writes me that this may have been due more to the season than to the locality.

The inland race has rarely been observed to depredate on timothy, and never in the manner followed by the Atlantic maritime race. It is two-brooded, and all members of the race macropterous, but in confinement freely interbreeds with brachypterous individuals of the maritime race. In Ohio the latter occupies the north and northeastern portion of the state, while the inland race covers the western and southern portion. The only exception to this that I have observed is the finding of two brachypterous individuals in hibernation in southwestern Ohio, not far from the Ohio River. The maritime race might have been brought into southwestern Ohio, either by being washed into the upper Ohio River in the northeastern part of the state and, as with some other species, carried down stream

and deposited in the fields along the river, or, possibly, by pushing through the Allegheny Mountains of Virginia and West Virginia from the Atlantic coast, by way of the valley of the Big Kenawaha River. Whether or not this was actually the case can only be determined by a study of the insect fauna of the Big Kenawaha valley. Mr. C. L. Marlatt, who has been making a study of the genital organs of both the maritime and inland races, writes me that he has not been able to find any material difference between them.

The Pacific coast race has not been carefully studied, or the area over which brachypterous individuals occur. It would indeed be interesting to know whether two races from the same original stock would develop alike, the one on the Atlantic coast and the other on the Pacific, as it would have a bearing on the oft-repeated question as to whether the same species can be evolved in two widely separated localities.

In summing up the testimony, then, the question put in my title can be answered only by saying that, with our present knowledge, there appear to be no differences between our known forms of *Blissus*, in North America, that cannot be accounted for by environmental influences. In this paper I have given them, tentatively, the position of separate races, but even that term may in future be found inapplicable. It is very significant that one cannot take up the study of an insect so common and well known as the chinch bug without encountering so many and such wide breaks in our knowledge of the species.